

EDWARDS SHEET STEEL BUILDING MATERIALS

THE EDWARDS GUARANTEE

The Edwards Manufacturing Company guarantees every article in this catalog to be exactly as described and represented. This guarantee fully covers every claim we make in this catalog for Edwards Metal Roofing, Siding, Ornamental Ceiling, etc. Should any part or parts be found to be defective through the use of faulty material or workmanship, The Edwards Manufacturing Company agrees to replace such part or parts when delivered to factory, FREE of expense to the customer.

This guarantee is in full force and effect without regard to date of purchase.

THE EDWARDS MANUFACTURING COMPANY,

MV6 awards.

President

TERMS

Our terms are cash with order, or one-fourth cash, balance C. O. D. to all customers concerning whom we are unable to obtain information from the authorities usually consulted in such matters.

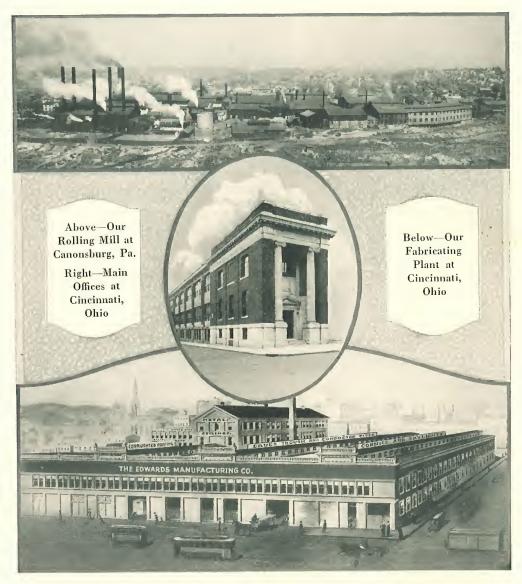
As proof of our responsibility and integrity we point with pride to the fact that any concern of any consequence in Cincinnati or any bank in this city will gladly tell you of our reputation for fair and square dealing, and attest to the fact that every statement we make concerning our goods or our policies may be relied upon to be the absolute and literal truth.

We have several million dollars invested in our plants. If you care to investigate our financial responsibility and resources we refer you to Dun & Bradstreet, Inc., or any other Commercial Agency in Cincinnati.

ASK YOUR BANKER TO INVESTIGATE AND ADVISE YOU



Edwards Can Guarantee Satisfaction Because Every Step From Ingot To Product Is Controlled In These Plants



Setting the Pace for the Industry Since the Year 1870



WHY EDWARDS COPPER BEARING STEEL

"How long will it last?" You ask yourself this question every time you cover a roof with metal, side a building, or in any way use sheet metal in building. The thought that prompts this question is the picture in your mind of your building five or ten years hence.

You want the security of mind that fireproof and lightning proof metal provides, but naturally you want to know what science has done to provide a building metal that is weather-proof.

Can you buy a material which combines the approximate rust- and corrosion-resisting qualities of copper with the strength of steel at a low initial cost?

Ever since iron and steel were first worked, man has tried to overcome and to minimize the effects of corrosion—the silent, never sleeping thief of metal.

Corrosion, as you know, is a form of oxidation. The sulphur in the metal or the sulphur oxides in the atmosphere combine with the moisture in the air to produce a dilute solution of sulphuric acid. This eats away the metal much as the sulphuric acid in a wet battery cell eats away the zinc, except, of course, on a very minute scale. Knowing this, as well as the fact that copper is not reacted upon by sulphuric acid in the absence of air, research men pondered whether the addition of a small amount of copper, making a steel and copper alloy, would not be a solution of the problem. Many alloys of steel and copper were made and subjected to exhaustive laboratory and practical tests in the weather until finally the ideal alloy was discovered.

The result is Edwards Copper Bearing Steel. Its endurance is evidenced on page three.





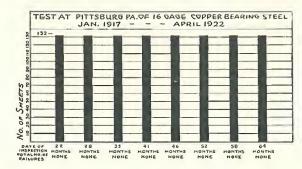
EDWARDS COPPER BEARING STEEL ENDURES



A sample of Edwards Copper Bearing Steel which had been immersed for two weeks in a solution of sulphuric acid. With the exception of the edge being a little ragged, the metal is still intact and strong.

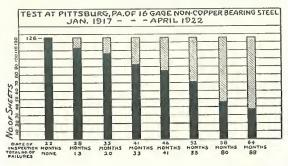
A sample of so-called rust-proof iron which has undergone the same test as the Edwards Copper Bearing Steel shown above. The edge is not alone ragged but the metal is eaten clear through.





This graph tabulates the results of tests of Copper Bearing Metals which were made by the American Society for Testing Materials at Pittsburgh, Pa. One hundred and thirty-two sheets of 16 gauge copper bearing steel were exposed to the weather. At the end of 64 months not one showed any failure.

A similar graph for the noncopper bearing metals made at the same time and place. Notice how quickly ordinary steel failed in competition with the superior lasting qualities of copper bearing metals. At the end of 64 months, eighty-eight of the one hundred and twentysix pieces tested had failed.





A STORY OF HONEST MANUFACTURE



The insistence on quality starts with the selecting and proportioning of the proper bar materials.

The first step of fabrication is that of rolling the bar steel into sheets.

One view of the hot mill. This bar of steel is heated red hot in the huge furnaces at the right, quickly carried across the room, and sent through the first rolling operation.

The steel is rolled out much as a pie-crust under the pressure of your wife's rolling pin.

"Roughing the Bar" is the first rolling operation. The red hot bar of steel is shoved through this roller and comes out considerably flattened out, and beginning to take on the appearance of a sheet.

The pressure and the rapid cooling destroy the uniform molecular formation of the steel.





After being roughed, the sheets are again heated red hot and passed through these rolls a second time. They come out at the other end rolled to one of the U. S. Standard gauges.

Such a process, however, is hard on the structure of the metal and sets up strains not to be desired in a well-made sheet.



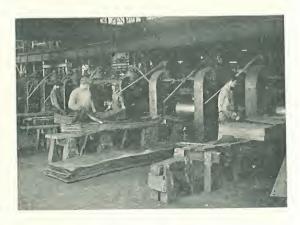


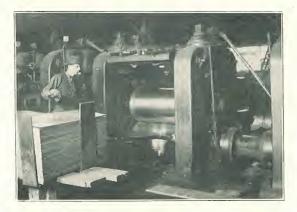
The next process, that of annealing, is to get the molecules back into proper and homogeneous order. The ultimate value of the sheet can be made or marred in this process.

To remove the strains set up in the rolling process the sheets are now annealed. They are piled on iron frames, covered with a huge iron box as the illustration shows, to be heated to 1500 degrees.

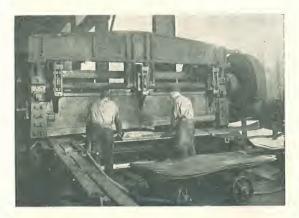
This heating takes from sixteen to twenty hours. The heat is then turned off and the box allowed to cool very slowly.

They must be rolled again, but this time between cold rolls. Because of the extreme heat of the annealing process the sheets frequently stick together. In pulling them apart they are bent and distorted. Illustration shows the smoothness being restored by means of cold rolling.





Naturally, this requires enormous pressure and gives a beautiful, smooth finish to the metal. The sheets coming out at the receiving end of the cold rolls. Notice what a smooth, beautiful finish the process has given to the metal. This operation requires enourmous pressure.



Cutting Sheets to Size

After going through the rolling processes the sides and ends of the sheets are uneven and ragged.

They are sheared to the finished size by a huge power shear which cuts the steel as though it was so much paper.

When the sheets come from the cold rolls they are "pickled."

In these pickling vats the sheets are cleaned of all the dirt and grease acquired in the rolling and annealing processes. If the galvanizing is to stick this must be carefully and thoroughly done.

The crane in the left-hand corner shows how the sheets are lifted and lowered into the vats.





From this "pickling" process they are passed through several baths of water to remove the loosened dust and grease, and to remove the acid solution.

This shows the sheets coming from the galvanizing pot to pass through another set of rollers which takes out all buckles.

Before galvanizing they are also passed through a solution of Sal Ammoniae which further removes and counteracts any of the acid and also helps the hot spelter to stick.

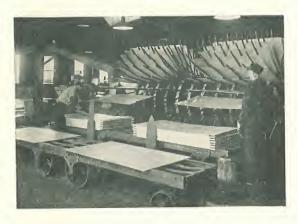


The sheets are now galvanized by the celebrated Edwards "Tightcote" process.

From the galvanizing pots the sheets automatically pass to these cooling wheels. Here the sheets receive their first inspection. Every sheet you will notice, is looked over and handled individually.

The spelter used in this process is a combination of pure zinc and tin, thus adding an element of protection to the steel sheets themselves.

As you will have noticed, every process of the entire manufacture is characterized by the most exacting care and attention to the details which ultimately make or mar the finished product.





Every sheet of Edwards Steel undergoes three inspections. With three pairs of keen eyes to pass upon the sheets there is little chance that you will get anything but a perfect sheet.

This rigid inspection is your assurance that when you use Edwards Steel Products for your work, they will be of the best it is possible to make.



THE ROOF . . .

the most essential part of every building

WITHOUT a roof how long could a building resist the destructive elements, such as sun, rain, hail, snow and ice, without becoming dilapidated and unsafe. The question, therefore, of covering for the roof is one of great importance.

Wood shingles, asphalt shingles and prepared roofings have a comparatively short life and offer no resistance to fire, and they, like asbestos shingles, slate and terra cotta tiles, being non-conductive of electricity afford positively no protection against lightning.

Galvanized steel roofing is the first choice of the discriminating buyer. It possesses every quality essential to a perfect roof covering. It is fireproof and lightning-proof, too, when properly grounded. Its extreme durability means that it costs least per year of service.

However, great length of service cannot be expected of all steel roofing. The method of applying many of them is so faulty as to definitely limit the service they render. If, in the application of a roof, nails are driven through a corrugation or crimp and remain exposed to the weather, the steel around the nail holes rusts away. Furthermore, the exposed fractures caused by nailing nullify the protective qualities of the zinc coating on the steel sheet. Another fault of such a method of applying lies in the fact that no provision is made for the expansion and contraction of the metal, which continuous process draws the nails from the wood sheathing.

Edwards Interlocking Roofings embody every feature essential to a perfect roof covering, and your perusal of the illustrations on pages 11, 12, 29-32, will acquaint you with roofings that give complete service and are of lifetime duration.

DURABILITY





1

Since '81

"I think you would be interested in getting the attached picture of my home at Tyrconnell which I had covered with Edwards Porter iron roofing back in 1881, over 54 years ago. I know

you will be gratified to know that the quality that your company builds into its sheet metal materials is certainly shown on this roof as it is in good shape yet."—M. L. Shields, Rosemont, West Virginia.

Since '98

"My house was covered with Edwards Metal Shingles some thirty-five years ago. It still is in good shape." — Joseph Caspari, General Merchant, Rayville, Louisiana.

"REO" Cluster Shingles Last

"Good for

20 years

more . . .

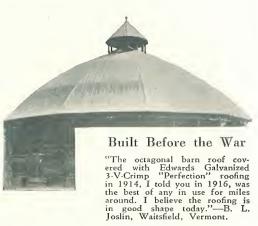
"I am enclosing the picture of my Gambrel barn covered with Edwards "REO" Cluster Shingles a year or so before the World War. We have found this to be a fine roof which does not rattle. It has been satisfactory in every way."—A. J. Molitor, Sauk Center, Minnesota.

All Steel Clad Barn—Fire and Lightning Proof

"Our barn was covered with Edwards "TIGHT-COTE" Galvanized Reo Cluster Shingles on the roof, Princess Cluster Shingles on the gables, metal weather board siding below the plate and beaded siding on the doors. This barn was built in 1926. The different styles of Edwards sheet metal with which it is covered appear to be as good as when put on."—Henry Zimmerman, Route 3, Little Falls, Minnesota.





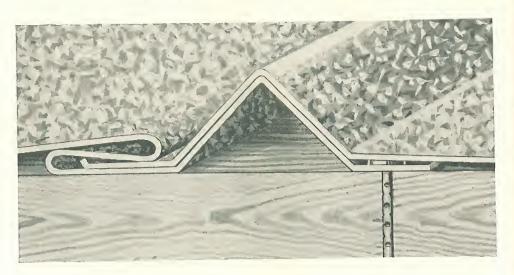




EDWARDS STEEL INTERLOCKING ROOFINGS

Endorsed By More Than Fifty Thousand Users!

Enlarged Reproduction of the Patented Interlocking Side Seam Used
Exclusively on Edwards "REO CLUSTER" Shingles
and Edwards "PERFECTION" Roofing



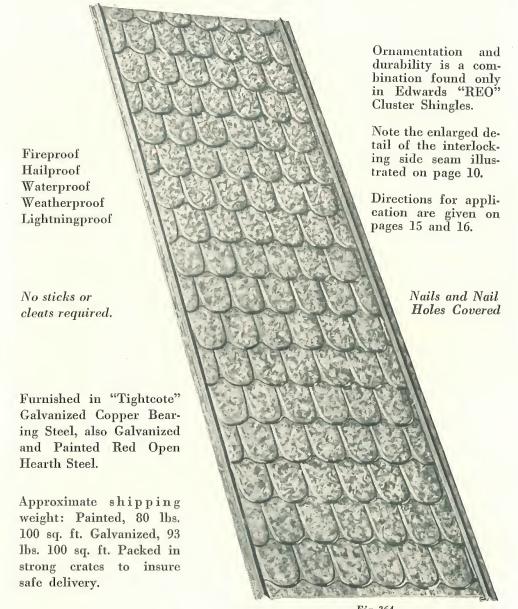
- Nails and nail holes covered and protected against the weather.
- 2 Expansion and contraction of the metal automatically provided for.
- 3 Loop permits air to circulate, preventing leaks by siphoning.
- 4 This interlocking joint locks and holds; insures no buckling and no leaks.

A Lifetime of Protection from Every Element—

Lightning, Weather, Fire and Hail



Edwards Steel Interlocking "REO" Cluster Shingles



Recommended for buildings having onesixth pitch or more as shown on page 60.

Fig. 364 (Patented) Sheets 2 feet wide and 5, 6. 7, 8, 9, 10, 11 and 12 feet long.



Edwards Interlocking "PERFECTION" 3-V-Crimp Steel Roofing



Approximate shipping weight: Painted: 80 lbs. 100 sq. ft. Galvanized: 93 lbs. 100 sq. ft. Packed in strong crates to insure safe delivery.

holes covered on all side seams. "Perfection" Roofing is a perfect covering for any building that has a roof pitch of one-sixth or more. Directions for application are given on pages 15 and 16.

Nails and nail

Sheets 2 feet wide and 5, 6, 7, 8, 9, 10, 11 and 12 feet long.

Fig. 376 (Patented)



"IMPERIAL" STEEL ROOF FIXTURES

For use in connection with Edwards Interlocking Roofings, are made from "Tightcote" Galvanized Copper-Bearing Steel also Galvanized Open Hearth Steel

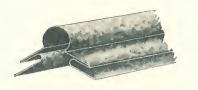


Fig. 362—"IMPERIAL" GALVANIZED RIDGE ROLL

(Applied before roofing sheets)
Made only in 10 foot lengths. See detail
drawing on pages 14 and 16.



Fig. 440—"IMPERIAL" GALVANIZED HIP CAPPING

(Applied before roofing sheets)
Made only in 10 foot lengths. Used same
as "Imperial" Ridge Roll.



Fig. 361—"IMPERIAL" GALVANIZED VALLEY

(Applied before roofing sheets)
Made only in 10 foot lengths. Fold allows sheets to
be securely locked to valley, the small bead acting
as a gutter, catching any water that may seep through
the lock. See drawing on page 16.



Fig. 366—"IMPERIAL" GALVANIZED PORCH FLASHING

(Applied before roofing sheets) Made only in 10 foot lengths. See drawing on page 14.



Fig. 344—"IMPERIAL" GALVANIZED GAMBREL ROOF JOINT

Made only in 10 foot lengths.

Applied over roofing on lower rafters and under roofing on upper rafters. See drawing on page 17.

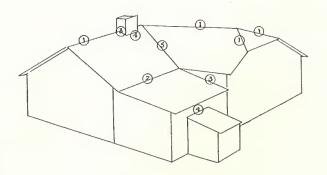


Fig. 349—"IMPERIAL" GALVANIZED EAVES STRIP

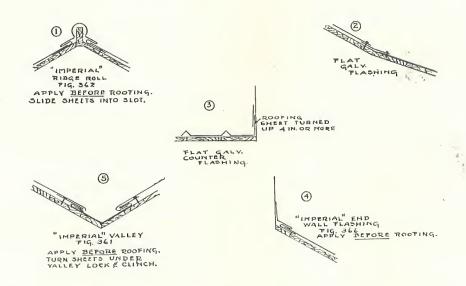
Made only in 10 foot lengths.

Applied before roofing at eaves, providing a proper finish over the barge board.





WHERE AND HOW TO APPLY "IMPERIAL" STEEL ROOFING FIXTURES



Edwards "Imperial" Roofing Fixtures are especially designed for use with our Interlocking "Perfection" Roofing, "Reo" Cluster Shingles and individual metal shingles. These diagrams show the location and proper application of each of the several "Imperial" Fixtures illustrated on page 13.



INSTRUCTIONS FOR APPLYING EDWARDS STEEL "PERFECTION" INTERLOCKING 3-V-CRIMP ROOFING (Fig. No. 376) AND "IMPERIAL" FIXTURES

Before starting to lay the Roofing sheets, carefully study all illustrations on page 16

Fixtures

1—Imperial Ridge Roll, Fig. 362; Hip Capping, Fig. 440; Flashing, Fig. 366 and 427; Ridge and Hip Finishes Fig. 805 and 807; Valley, Fig. 361, and Eave Starter, Fig. 349, must be applied before the roofing sheets. Nail only through the nailing apron, join the lengths together, telescoping the ends.

Winds

2—Before applying "PERFECTION" 3-V-Crimp Roofing, consider the direction from which your hardest winds usually come and start laying the roofing sheets from that end of the building, so that the winds will blow over rather than against the interlocking seam. This does not apply to our "REO" CLUSTER Shingles, as the sheets are not reversible and must always be applied from left to right.

Using one length sheet to cover rafters 3—At the gable end, allow the side of the first roofing sheet to extend to about the center of the first V crimp. Bend this straight down to provide a flange for nailing to either the ends of the sheathing or facia board. At the eaves, allow the sheet to extend one and one-half inches, slit the flat portion of the sheet on each side of the crimps and turn down to form a nailing flange. Where one length will reach from eave to comb, slide it up into the Ridge Roll. Nail the turned down edges to the gable and eaves and then nail the entire nailing flange on the lock side of the sheet. The next sheet is cut at the eaves only, the same distance as the first, then locked into the first sheet (see Paragraph 4), and slid into the Ridge Roll. The nailing flange on the lock side is then nailed the entire length of the sheet.

Locking Sheets

- 4—To interlock the sheets, stand them on edge almost vertically, allowing the tongue to become engaged the full length of the sheet, then drop it flat onto the roof and slide into position.
- 5—UNDER NO CIRCUMSTANCES MUST THE INTERLOCKING SEAM BE TAM-PERED WITH EXCEPT AS DIRECTED IN PARAGRAPH 7, AS IT IS SCIEN-TIFICALLY CONSTRUCTED TO PERMIT AIR CURRENTS PASSING THROUGH THE LOCKS.

Using two or more sheets to cover rafters 6—Where two or more length sheets are necessary to reach from eaves to comb, proceed as directed in Paragraph 3, but nail only along the gable end and do not nail the flange on the opposite side of the sheet until the upper sheets are in place and telescoped. (See illustration No. 5.)

Telescoping

- 7—To telescope the interlocking seam, use the claw of a hammer or some blunt edged tool and open the lock slightly the distance of the lap, opening the lock on the top side of the lower sheet and the under side of the upper sheet. (See Illustration No. 2.) Slide the sheet up into the ridge roll (See Illustration No. 5) then return to where the sheets overlap and contract the lower sheet sufficiently to engage the INTERLOCKING SEAM. (See Illustration No. 3.)

 When the ends of the sheets are telescoped securely, nail them through the end lap, using galvanized nails and lead washers or lead headed nails, placing three between each of the crimps, then nail along the entire nailing flange at the side of the sheet.
- 8—IT IS IMPORTANT where two or more length sheets are necessary, to complete each course from eaves to comb before starting the next course.
- 9—At the opposite gable end, where the last sheet finishes, before cutting off any surplus metal, allow for about one and one-half inch projection to be turned down and nailed.
- 10—IMPERIAL VALLEY, Figure 361, must be applied before the roofing sheets, nailing same only through the nailing apron as directed in Paragraph 3.

Valleys

- 11—To connect roofing sheets to IMPERIAL VALLEY, cut them to the angle of the valley, allowing one inch at the lower end of the sheet to extend over the fold in the valley. Then slit the sheet between the crimps (same as at eaves) turning at end to form a hook. Connect with the adjoining sheet and slide it upward to hook onto the valley, then nail the side of the sheets and close the fold in the valley by hammering it down, using a wooden mallet or a block of wood and an ordinary hammer.
- 12—After the roofing sheets are in place, close the slot of the RIDGE ROLL by hammering on a block of wood laid on the apron between the roofing crimps. (See Illustration No. 5.)

13—NEVER HAMMER DIRECTLY ON METAL ROOFING WITH A STEEL HAMMER. USE EITHER A WOODEN MALLET OR A BLOCK OF WOOD OVER THE PART WHICH YOU WISH TO HAMMER AND HIT THE WOOD.

Caution!

14-Any projecting crimps at eave or valley may be cut off or folded to make a neat job.

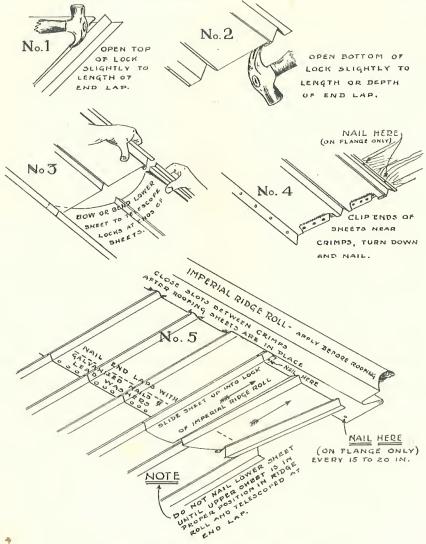
"REO" Steel Cluster Shingles (Fig. No. 364)

15—All instructions given relative to the application of "PERFECTION" 3-V-CRIMP Roofing, will also apply to the application of "REO" CLUSTER Shingles except as noted in Paragraph 2.



To secure the best possible results in the application of Edwards "PERFEC-TION" Interlocking 3-V-Crimp and "REO" CLUSTER Shingles, the instructions on page 15 should be carefully read as several references are made to these detail drawings. Do not hammer down the side lock after the sheets are enmeshed. The loop in the lock permits the air to circulate, thereby preventing syphoning or capillary attraction.

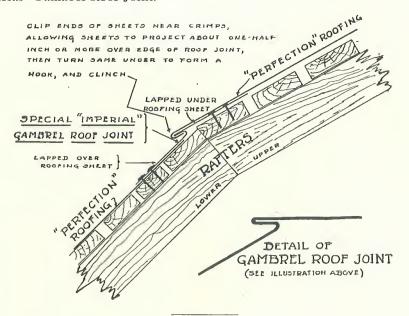
Special instructions relating to application of Edwards Interlocking "PERFECTION" and "REO" CLUSTER Roofings:



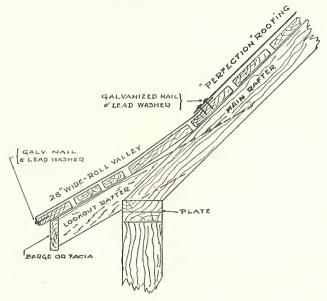
Note also Drawings on Pages 14 and 17



Special instructions relating to the application of "PERFECTION" Interlocking 3-V-Crimp and "REO" CLUSTER Shingles on Gambrel roofs, using Edwards "Imperial" Gambrel Roof Joint.



Special instructions relating to application of Edwards Interlocking Roofings in conjunction with Roll Valley on lookout rafters.





EDWARDS "STICKLESS" STEEL ROOFING

Notice the Unique Construction of the "Stickless" Crimp

LEAK PROOF

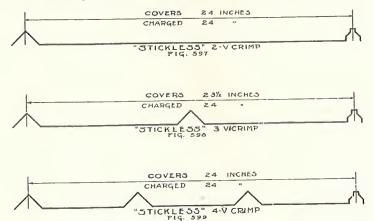
FIRE PROOF

TROUBLE PROOF LIGHTNING PROOF

This Improved Side Lap is positively leak proof. The spaces between the crimps form passages through which air passes continuously thus preventing water from syphoning through the seams.

No sticks are required to support the crimps as the rigidity of the "Stickless" Crimp prevents flattening when the sheets are being nailed to the roof sheathing.

Galvanized nails and lead washers, lead head nails or "calkscrews" should be used and driven through the center of the crimp as illustrated above.



"Stickless 2, 3 and 4-V-Crimp Roofing is made from Open Hearth Steel, painted red; Open Hearth Steel Galvanized, and from Edwards Copper Bearing Super Steel, Galvanized.



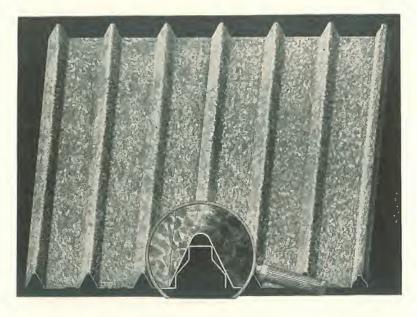
"STICKLESS" ROOFING IS A STEP AHEAD OF ANY OTHER CRIMPED ROOFING

The necessity for special drains or channels to carry off water that gets past the seams is entirely eliminated.

The Air Passages Prevent It

Anyone who can drive a nail can apply Edwards "Stickless" Roofing and be certain that the completed roof will be water and weather tight. It can be applied to tight or open sheathing and to any kind of building on

which the roof pitch is of four inches or more to the foot.



"STICKLESS" 4-V-CRIMP

Fig. 599

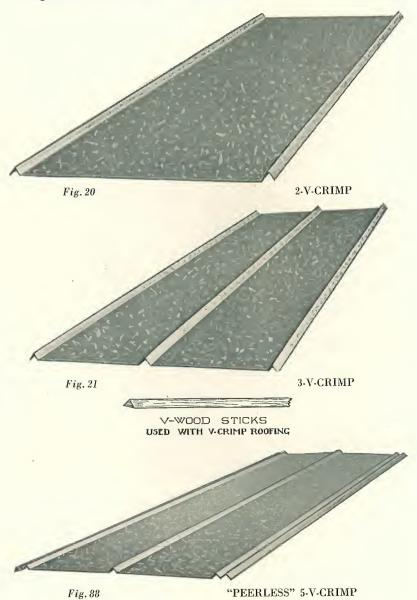
Edwards "Stickless" 2, 3 and 4-V-Crimp Roofing is furnished in sheets 5, 6, 7, 8, 9, 10, 11, and 12 feet long.

It makes a roof that is pleasing in appearance and is adaptable to residences, barns or out-buildings alike.



V-CRIMP ROOFINGS

Adapted To Use On Roofs Of 1-6th Pitch* Or More



* For explanation of Pitch, see page 60



Figure 20.—2-V-Crimp Roofing sheets are made from "Tightcote" Galvanized Copper bearing Steel, also Red Painted and "Tightcote" Galvanized Open Hearth Steel.

Furnished in 5, 6, 7, 8, 9, 10, 11 and 12 foot lengths.

Covers 24 inches and charged as 24 inches wide.

Triangular shaped wood sticks should be used under the crimps and are included in our prices unless otherwise specified.

Figure 21.—3-V-Crimp Roofing sheets are also made from "Tightcote" Galvanized Copper Bearing Steel, also Red Painted and "Tightcote" Galvanized Open Hearth Steel.

Furnished in 5, 6, 7, 8, 9, 10, 11 and 12 foot lengths.

Covers 24 inches and charged as 24 inches wide.

Wood sticks should be used under all crimps. Our prices include the necessary sticks unless otherwise specified.

Figure 88.—"Peerless" 5-V-Crimp Roofing sheets are made of the same high quality "Tightcote" Galvanized Copper Bearing and Open Hearth also Painted Open Hearth Steel sheets as listed in connection with the two styles of roofing listed above.

Furnished in 5, 6, 7, 8, 9, 10, 11 and 12 foot lengths.

Covers 24 inches and charged as 24 inches wide.

May be used either with or without wood sticks. Unless otherwise specified, our prices do not include the cost of sticks.



CORRUGATED SHEETS

In 5, 6, 7, 8, 9, 10, 11 and 12 foot lengths made from "Tightcote" Galvanized Copper Bearing Steel, as well as Red Painted and "Tightcote" Galvanized Open Hearth Steel.

Corrugated sheets, one of the strongest forms of sheet metal, impart strength and rigidity to structures to which they are attached; are especially adapted to buildings with little or no wood sheathing; are not recommended for roofing where the rise is less than 4" to the foot. Use only lead head nails, galvanized nails with lead washers, or "calkscrews."

Fig. 25 1¼ inch Corrugated

Edwards	COVER when lapped
Corrugated Sheets	1 1½ 2
Sheets	corrugations
Figure 25	24" 231/4"
Figure 27	24" 22½" 21¼"
Ch	arged 26" wide

 $\begin{array}{c} Fig.\,27 \\ 2\frac{1}{2} \ inch \ Corrugated \end{array}$



Fig. 200 Ridge Roll



Fig. 300 Gambrel Ridge Joint Also Ridge Capping



Fig. 199 End Wall Flashing

Corrugated Fixtures

Furnished Only in Ten Foot Lengths

Always specify whether fixtures are desired for the 1½" or 2½" Corrugated sheets, and whether in "Tightcote" Galvanized Copper Bearing Steel or Galvanized Open Hearth Steel.



Fig. 198 Side Wall Flashing



ROOF FIXTURES FOR V-CRIMPED, PRESSED STANDING SEAM OR ANY STYLE OF PLAIN SHEET METAL ROOFING

Also Wood Shingles, Slate, Slate Surfaced or Asbestos Shingles and Composition Roofing



Roll: 2 inches wide Apron: 2½ inches wide

Fig. 9—GALVANIZED PLAIN RIDGE ROLL

Made only in 10 foot lengths Applied over roofing



Apron: 4 inches wide

Fig. 8—GALVANIZED PLAIN V-CAPPING

Made only in 10 foot lengths
Applied over roofing



Fig. 17—GALVANIZED FORMED VALLEY

Made only in 10 foot lengths Applied under roofing



Fig. 349—"IMPERIAL" GALVANIZED EAVES STRIP OR ROOF STARTER

Made only in 10 foot lengths

For neatly finishing metal roofing along the eaves, covering the
barge board. Applied before roofing.



Fig. 344—"IMPERIAL" GALVANIZED GAMBREL ROOF JOINT

Made only in 10 foot lengths Applied over roofing on lower rafters and under roofing on upper rafters. See drawing on page 17.



STANDING SEAM ROOFINGS

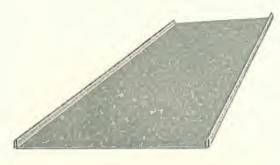


Fig. 23 PRESSED STANDING SEAM IN SHEETS

Illustration shows sheets exactly as shipped, with side seams formed and ready for application. Galvanized Cleats are always furnished with this style of roofing.

Covers 24 inches, and charged 24 inches wide. Furnished in 5, 6, 7, 8, 9, 10, 11 and 12 foot lengths.

Both styles of roofing shown on this page are made from "Tightcote" Galvanized Copper-bearing Steel, also Red Painted and "Tightcote" Galvanized Open Hearth Steel.

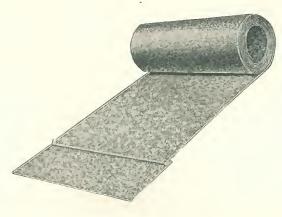


Fig. 18 SELF-CAPPING STANDING SEAM ROLL ROOFING

Each roll contains sufficient material to lay 100 square feet on the roof.

Our Roll Roofing has double cross-locks, which are formed at the factory, assuring absolutely water-tight end locks.

DETAIL OF DOUBLE CROSS LOCK
THICKNESS SLIGHTLY EXAGGERATED

Especially adapted to roofs having very little pitch or fall, furnishing a roofing far superior to composition roll roofings which are frequently used on buildings of this character.

(See page 57 regarding tools.)

Complete instructions for applying either style of roofing shown on this page will be sent on request.



GALVANIZED NAILS AND LEAD WASHERS

It is advisable to use Galvanized Nails when applying roofing and siding. Where the nail heads are exposed, Lead Headed Nails should be used, or Lead Washers may be used in conjunction with the Galvanized Nails. Cut shows Nail and Washer, but they are sold separately. We can furnish Galvanized Nails 1-inch, 13/4-inch and 21/2-inches long. Usually, one-third pound of 1-inch nails are



required for a square of Interlocking Roofing, Standing Seam Roofing or Metal Siding. As a rule, about one pound of 1¾-inch nails are required for each square of Corrugated, V-Crimp or any style of roofing where the nail head does not lay flush with the metal and sheathing. About one-half pound of Lead Washers are needed for each pound of 1¾-inch nails.



The NEW and BETTER Way





Our method of manufacture enables us to envelope the nail head with exactly the proper amount of cold lead. No excess lead is necessary because we have no melting and cooling problems to contend with. The cold-compression process makes so tight a bond between the steel nail and the lead that the heads STAY on. Nor does driving impair the body of lead on top of the nail head.

One pound of Compressed Lead-head Nails (1¾-inch size, running 90 to the pound) is all that is necessary to lay one square of corrugated or V-Crimp roofing.



Fire at Monroe City, Missouri, at 11 A.M., April 25, 1924. Courtesy Na-tional Board of Fire 25, 1924. Co

These clippings are from Cincinnati newspapers. Edwards steel Roofing on these buildings would have prevented every one of these fires.

Page Twenty-six

Born Under Fire

Baby Arrives as Roof of Home Burns

Special to The Post,

RICHMOND, IND., Jan. 13 .-Old Man Stork was given a warm reception here late yesterday when he visited the home of Professor and Mrs. Chester Harter.

The wily bird found a physician, a minister, a fireman and a policeman at the home and the roof ablaze.

The roof of the home caught fire just as the beby, a daughter, arrived. The fire was extinguished with small loss and both mother and child are "doing well."

FIRE DAMAGE \$1,500

Sparks from a chirancy ignifed a filingle roof at the home of J. M. Robinson. 106 Carolina Avenue, Fort Thomas, yesterday, causing damage estimated at \$1,500. The fire was reported by neighbors. Fort Thomas firemen under Chief Barney Nielander prevented the flames from spreading.

FIRE DAMAGE \$2,000.

Blaze Starts From Chimney Sparks At Madisonville Home.

Fire which started from sparks from a chimney caused damage esti-mated at \$2,000 to the two-and-onehalf-story two-family dwelling at 4533 Hexter Street, Madisonville, yesterday afternoon.

Marshal Louis Schraffenberger and his men confined the blaze to the roof and false attle of the house. Members of the family of R. W. Sandburg, who occupy the first floor, were not at home at the time the fire was discovered.

Investigation by Marshat Schraffenberger revealed that workmen refinishing the unoccupied apartment on the second floor had been using the furnace in the basement to burn rubbish. It is believed sparks from the rubbish ignited the shingle rook. Marshal Lopis Echraftenberger and

FIRE DAMAGE IS \$50

Sparks From Chimney Blamed in Storage House Braze

Sterage Heuse Braze
The Covington Fire Department,
was called Monday shortly, after
recon to extinguish of fire Sections
Kitayers Sterage Sections
Kitayers Sterage Sections
Fire Starks from a chimtill a 1800 055.
Firenen also were called to the
home of Lindsey C. Jackson, 235
E. Robbin-st, Covington, where a
stefective flux set fire to the mod.
Causing \$10 outnage.

PIRE DAMAGES KOOF-Sparks from a chimney ignited

FLYING SPARKS

Cause Three Blazes.

Damage Held To Only \$520-Fireman Steps On Nail-Another Burned Slightly.

Sparks from chimneys caused three fires yesterday, resulting in damage of \$520. One fireman was hurt when he stepped on a nail., Another was burned slightly when extinguishing a gasoline fire in another blaze in the West End.

The shingle roof of the home of Edward Johnson, 3776 Aylesboar Avenue, caught fire from chimney sparks. Marshal William Cunningham said the loss was \$200.

Marshal Cunningham and his men also extinguished a fire of similar origin at the home of Forest Little, 5102 Kenwood Avenue. Less was \$20.

Firemen under Marshal John Fergusen were called to the home of August Newstedt, 2591 Observatory Avenue, when sparks from an incinerator chimney ig-nited the roof. Fireman William O'Reilly, Company 31, suffered an injury to his right foot when he stepped on a nail. After receiving treatment at General Hospital ho returned to duty. Damage to the Newstedt home was \$300.

FIRE DAMAGES RESIDENCE

Fire on the roof of the 215-story frame nouse of David Brown, contractor, 105 W, 66th st, Monday caused about \$100 damage. The roof was ignited by sparks from burning paper, in the furnace.

SPARKS SET FIRE TO HOME

Damage estimated at \$50 was done to the home of Mrs. Rose Hoeffinghof, 4249 Eastern-av, carly Wednesday when sparks from a chimney set fire to a shingle roof.

SPARKS IGNITE ROOF

Of House Of Military Science Teacher-Damage Is \$600.

Damage estimated at \$600 was caused yesterday when fire, appar-ently started by sparks from the chimney at the home of Major can'ty started by goarks from the chimney at the home of Major Shiney Earl Wolfe, professor of military science, University of Cincinnati, 3319 Auit View Avenue, sei fire to the roof and spread to the second floor.

Firemen under Marshal Louis Schraftenberger extinguished the fire after a neighbor saw smoke and turned in an alarm, Smaller fires yeaterday were: 50 West Sixth Street, owner, Sanuel Johnson, 1040 Freeman Avenue, floor in front of grate, 328; two-

SPARKS IGNITE ROOF.

College Hill Fire Causes \$600 Loss -Smoke Hampers Firemen.

Damage estimated at \$500 was caused at the home of Harold Ros Smith, 5745 Hamilton Avenue, Col-lege Hill, by fire yesterday after-

Extra companies were summoned by Marshal Chester Held. The fire

by Marshal Chester Held. The fire-started when sparks from a chim-ney is nited the shingle 100f. The Tiames spread to the inside and damaged a part of the rear of the building before it was extinguished. Firemen were forced to fight the blaze from inside the building and were hampered by dense smoke. The extra companies were in charge of Assistant Chief Edward Shear-wood.

FIRE LOSS \$1.500-

A part of the roof on the home of C. C. Irwin, 15 Mt. Nebb road, Cleves, was destroyed by fire which caused a was destroyed by the wint caused loss of \$1,500, Sunday, Cleves fire-men, under Chief Harry E. Parsons, responded and prevented the blaze from spreading. The loss was partly insured.

The root and near of the home of lirs, Martha Schraffenberger. 128 West Sixty-Eighth Street, Carthage, was destroyed yesterday at noon by a fire starting from gnerks juniting the root. Damage was estimated at \$1.500.

Marshal Chester Held gaid the

Marshal consister real sand atti-tion of wood shingles and atti-were gone when litemen arrived.

A larger loss was prevented when firemen covered household goods on the lower floors with tarpaulins.

the Damages Westwood Home—State from a chipmen at the ship of the

SPARKS IGNITE ROOF-

DEAMES IGNITE ROOF—
Sparks from a chimmey ignited the chimples on the root of the home of Hirzabeth Tone, 344 Walworth avenue, East End, Monday room, causing damage estimated at \$200. Firemen in charge of Acting Marshal William Reeder extinguished the blase.

Sparks ignited the roof of the home of Mrs. Blizabeth Jacobs, 3280 Montana avenue, and caused a loss

Sparks Fire Roof Sparks from a chim-ney set fire to the council roof of the from or Printy Statemeyer, 6021 Rose Street, Madiscoville, yesterday and caused damage catimated at \$50.

Mrs. Jacob Keshover, 3255 Delaware avenue, was assisted from her home, Sunday, when fire caused a loss of \$2,000. Sparks ignited the roof. Neighbors noticed the flames of the country of the claim. roof. Neighbors noti

Lightahur Seta Roof, On Fire—Lightalar camaged the four of the home of E. W. Jung, 228 Woolper Avenue, early perfer-day. The resulting blass was extinguished by firemen under Marshal John Ferguson, who renorted a Jone of appraximately 25.5.

with on EDWARDS Steel Roof



Photograph of Residence of C. H. Noyes taken immediately after the fire Buildings to windward laid waste

THIS EDWARDS ROOF STOPPED A \$15,000,000 CONFLAGRATION IN TEXAS

The Paris, Texas, fire, March 22, 1916, caused property loss of \$15,000,000. In this tremendous catastrophe the wooden roof buildings quickly spread the fire, with the result that only a few residences were left in the business district. These had metal roofs. Mr.

Noyes states in his letter, quoted on this page, that his residence covered with Edwards Metal Spanish Tile, stopped the fire on South Main Street, thus saving over \$1,000,000 worth of property. The total fire loss each year in the United States amounts to more than all the gold, silver, lead, tin, zinc, nickel and aluminum produced yearly in the United States.

Paris, Texas, April 14, 1916. The Edwards Manufacturing Co., Cincinnati, Ohio. Gentlemen:

It gives me great pleasure to recommend your Metal Tile Roofing. This together with the Stucco of which my home is built, stopped the fire in that direction, which swept over a large portion of our city, no doubt saving a million dollars worth of property. I take the liberty of writing you this because I feel that your product was put to a severe test.

Yours very truly, C. H. NOYES, President, The First National Bank. Fire contributes materially to the high cost of living. Every loss by fire means an actual loss to the property owner, regardless of insurance, and thus contributes materially to the general cost of living. Experience proves that the wooden roof is the most dangerous factor

in spreading fire. The Paris conflagration amply demonstrates this fact. Edwards Metal Roofing saved the homes of hundreds of families. Besides the property loss, every builder and home owner breathes freer because of the security for himself and his family under a fire-resistant Edwards Metal Roof. Look at the tinder roofs around you and see your danger in case of fire.





One Piece Non-Loosening ZINCLAD Nails Insure a Tight Roof

CALK-SCREWS and SPIRALS are the only nails which provide all the essential features: (1) a spiral shank which holds four times better and will not pull out; (2) a heavy zinc coating which protects the nail itself and also assists in preventing rust on the roofing around the hole. EDWARDS Metal Roofings are made to give a lifetime of service and we want our customers to have full enjoyment of all this inbuilt service. These non-loosening nails are recommended for long trouble-free use of the roofing which you buy.

CALK SCREWS

all one-piece

For corrugated, V-Crimp and other EDWARDS Roofing where the nail head is exposed.



CALK: Meaning leakproof; it plugs and seals the hole. SCREW: Meaning to hold tight. One-piece design guarantees that the head will not loosen or come off. Non-loosening screw shank won't pull loose. Soft flexible head and plug seals nail hole from moisture. Extra heavy zinc coated; won't rust. Won't leak. CALK-SCREWS are excellent for renailing old roofs where nails are pulling out. You will need about 105 134" CALK-SCREWS in number or one pound in weight per square of

Actual Size roofing that you have to lay.

SPIRALS



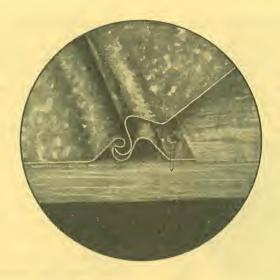
Actual Size

For interlocking and other roofings where the nail head is concealed. Non-loosening shank. Holds roofing fast. Three-eighths inch flathead. Extra heavy zinc coated; wont rust. Only one size—1"—as illustrated. About 230 nails per pound or one-half pound per square.

ECONOMY

There are two important reasons why it is more thrifty to use non-loosening CALK-SCREWS and SPIRALS. Naturally, roofing can't last longer than the nails which hold it. Their small cost per square of roofing repays many times their investment in labor, trouble, repairs, even new roofing. Also, the large number to the pound keeps down the cost to the user. Be sure to order CALK-SCREWS or SPIRALS with your EDWARDS Metal Roofing and lay it for a lifetime.





EDWARDS LOXSEAM

first fundamental improvement of interlocking roofing in years

The builder who has been looking for something better, will recognize at once in LOX-SEAM the only important contribution to the roofmaker's art in many years. At the turn of the century, the name of Edwards soon became synonymous with progress by the vast improvement of Perfection Interlocking and Stickless roofings over the time-honored corrugated sheets. Unsatisfied, Edwards now offers a still better interlocking roofing.

The picture above shows clearly the crux of the new development . . . Edwards LOX-SEAM . . . which gives this better interlocking sheet metal roofing its name. You will have to put it on a roof to really appreciate its advantages which range from saving of labor of application to positive assurance against blowing out, leaks, buckling, rattling; assurance of easy laying even by the inexpert. LOXSEAM locks this roof to stay.



lays twice as fast and will not blow out

The cost of putting on a roof depends on the number of operations. It takes two hundred wood shingles to cover a surface equal to a ten-foot sheet of LOXSEAM. Besides the number of operations, it takes more energy to handle the greater weight.



This photograph shows clearly the knack of opening up the LOX-SEAM with an ordinary claw hammer to make the end lap

For instance, a square of individual heavy asphalt shingles weighs three hundred pounds, whereas a square of Edwards LOXSEAM weighs ninety pounds.

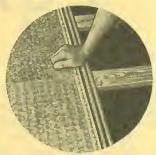
Finally, LOXSEAM is easier to lay than other interlocking sheet metal roofing because (1) the sheets are re-squared before forming to insure perfect fit and alignment; (2) LOX-SEAM itself makes lapping simple.

To make the point clear, three roofers in Southern Ohio applied ten squares of LOXSEAM in one hour. Conservatively, LOXSEAM can be laid in half the time it takes to lay ordinary interlocking roofings. Before announcing LOXSEAM the Edwards Manufacturing Company developed the easy application which any man can quickly master.

Of course, the side lap operation with LOXSEAM represents no problem, as is illustrated on page just preceding. The end lap is practi-

cally as simple once the method is known. The two photographs on this page show exactly how. First, the LOXSEAM is opened with a hammer, an ordinary claw hammer as pictured opposite, or better still if you have one handy, a roofing hammer. Open the seam a little for about six inches of its length. Next, lap over the sheet to be laid just above it, perfectly lined. Smartly crack down your palm on the LOXSEAM, as shown in the picture below, springing it into place. The job is done.

The wind problem of builders in the South and West was very much in the mind of the inventor in the development of LOXSEAM. Unquestionably, LOXSEAM offers absolute protection even under the most adverse conditions because the lock will not blow out. The sawtooth edge of the major ridge forces its hook up under the minor ridge, as shown particularly



Actual photograph of builder springing LOXSEAM end lap in place after seam has been opened by hammer as pictured above

on page twenty-nine, insuring against the sheets blowing out of the lock. A LOXSEAM roof becomes practically a solid piece of metal. Of course, ample allowance has been made for contraction and expansion both in the LOXSEAM itself as well as in the "V" in the center of each sheet.



EDWARDS LOXSEAM

Edwards LOXSEAM sheets measure, cover and are charged twenty-four inches wide. There is no loss whatever for side lapping. The sheets are made 5, 6, 7, 8, 9, 10, 11 and 12 feet long of painted open hearth steel; of galvanized open hearth steel and galvanized copper bearing steel.

The photograph at the bottom shows how easily the two pieces of the ridge finish are joined, the crimp of the left easily slipping over the crimp of the right ridge finish. There are, however, no rights and lefts as both pieces are interchangeable. When you order 100 feet of Fig. 583 you will receive 200 feet of semi-ridge finish, as shown in the picture below. The LOXSEAM gambrel and endwall flashings also contribute to make the application of Edwards LOXSEAM easy.

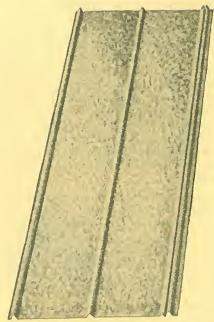


Fig. 572 LOXSEAM ROOFING SHEET



Fig. 584 LOXSEAM GAMBREL FLASHING

"a tailor-made roof"

June 11, 1934

Letter to Oklahoma Dealer from his Customer:

They have now completed my roof which I will say is the finest roof that could be bought anywhere for the money, as the carpenter said when he finished it. LOXSEAM is certainly a tailor-made roof. It is absolutely leak-proof. I think anyone seeing Edwards Galvanized LOXSEAM nailed on wouldn't use any other kind. You may use any part of this letter that you wish and word it for yourself as there is nothing too good that can be said about Edwards Roofing.

Yours very truly,

Washington, Oklahoma Bryan Goldsby.



Fig. 585 LOXSEAM ENDWALL FLASHING





covered nails double life

As to drainage, the ridges of LOX-SEAM are both water and snow deflecting. The valley between is so small very little water or snow can enter. Once in, it quickly drains, almost from a flat roof. In fact, LOXSEAM can safely be laid with pitch as low as ½ (see page sixty for explanation). It carries off water where a wood shingle roof would leak. LOXSEAM positively is leak-proof.

Furthermore, nails are driven through the special nailing flange, then covered by the side lapping sheet (see page twenty-nine). This special LOXSEAM feature effects exposure to the weather of a solid galvanized iron roof, tending to double its life as against roofs with exposed nails.

Referring to illustration on page twenty-nine, you can easily see that because the nails are driven in plain view through the special nailing flange and roof sheathing, you do not lose time and bungle as you do in driving nails blind in laying other forms of sheet roofing.

The LOXSEAM roof on residences or photographs we have give excellent evidence that this improved interlocking sheet in appearance alone justifies the difference in price without consideration of its lasting qualities.

ALASKAN ENTHUSIASTIC

Kodiak, Alaska

The Edwards Manufacturing Company Cincinnati, Ohio

We have roofed one of our buildings with Edwards LOXSEAM Interlocking Sheets. We believe it fully solves our roofing problem. The ease and economy with which LOXSEAM is laid makes it far cheaper in place than other materials that we have heretofore used. A tight roof is a very important consideration here. It is our opinion that LOXSEAM would prove an excellent material for the Nome reconstruction. Very truly yours,

W. J. Erskine Company, W. J. Erskine, President.

This appearance is greatly enhanced by the characteristic peculiar to LOXSEAM of lying flat on the sheathing, as shown by the picture at the bottom of this page, as well as by the covering of the nails by the overlapping sheets. Furthermore, the "V" in the center which makes some provision for contraction and expansion and adds rigidity of the roof, considerably improves the looks of the roof.

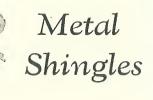
LOXSEAM can be applied directly over wood shingles and has a full salvage value as it can be taken from one roof and applied to another without the loss of a single sheet.

All told, LOXSEAM is the preferred roof because it is simple and quickly laid, is solidly locked against blowing out or rattling, lays beautifully flat, provides quick drainage and should last twice as long.

Note how LOXSEAM sheets lay flat on the sheathing, insuring a lasting, beautiful job, and the 5 crimp effect when the sheets are locked together







THE English half timbered stucco cottage, which is so popular, with the many nooks and corners, entrances and gables, permits very little choice of a roof design. In former days slate was used almost exclusively, but slate is so heavy and cracks so easily. It was natural that the progressive "Sheet Metal Folks"

should fill the want with a metal shingle. Since the first design of a generation ago, many new ones have appeared. Refinements have been made and also improvements in the locking device in order to adequately take care of contraction and expansion. Originally metal shingles were made almost entirely of Tin and Galvanized metal, but during the last few years the demand is constantly increasing for Zinc and Copper shingles.

EDWARDS METAL SHINGLES



OLD ENGLISH Fig. 230 Size 10 x 14 inches





FRENCH METAL SLATE
Fig. 209
Size 10 x 14 inches



ROMAN
Fig. 211
Size 10 x 14 inches
(See Cover)

EMBOSSED METAL SHINGLES

cannot crack and fall off nor can they be injured by hail.



QUEEN ANNE Fig. 157 Size 10 x 14 inches



TEMCO Fig. 208 Size 10 x 14 inches also 14 x 20 inches

The five most popular designs of Edwards Metal Shingles are illustrated on this page. They are made from Terne Plate (more familiarly known as "tin") painted red, Copper-bearing Steel, painted red, also "Tightcote" Galvanized Copper-bearing Steel, Galvanized Open Hearth Steel, Zinc and Pure Copper.

Edwards Metal Shingles will give your home that distinctive appearance that can be obtained from no other type of roofing.



"OHIO" METAL SHINGLES

One size only — 14 x 20 inches



Fig. 175

Just twice the size of our other patterns, therefore can be applied twice as quickly and cheaply. Because of the larger size and deep embossing, the "OHIO" is much better adapted to application over old wood shingles or composition roofing.

The old roof should be reasonably even and firm and all projecting nails withdrawn or driven into the sheathing, so they will not come in contact with the metal shingles. Be sure that the new nails are driven into the sheathing boards.

Much Easier to Lay Than Ordinary Roofings

If your present roof is not in harmony with the rest of the building, you will be glad to know that reroofing does not mean tearing off the old roof. Unroofing is not only an expense, but is always attended with a lot of mess and dirt.

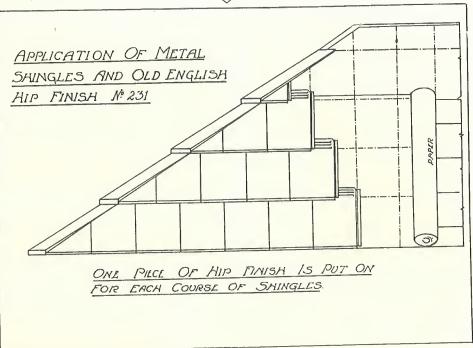
The picture at the right shows how easy it is to cover a wood shingle roof with the jumbo size OHIO Metal Shingles like the illustration above. As a matter of fact, it is a whole lot easier than most kinds of roofing to lay because of (1) fewer, bigger pieces to lay; (2) less weight to handle. It takes 64 Ohio Metal Shingles weighing 90 pounds to cover 100 square feet. If you use wood shingles, you will have 16 times as many to lay or 1000 to the square. And you'll handle nearly three times as much weight.

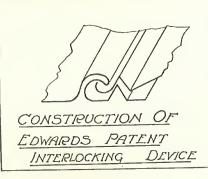
Martin Dahl, Gayville, South Dakota,

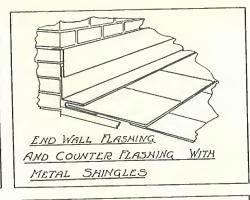
laid OHIOS right over the old, reporting: "They lay just as smooth . . . as if they were on boards. Carpenters did not believe they were laid over wood shingles."

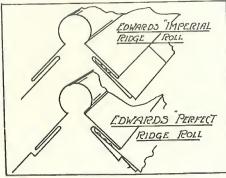


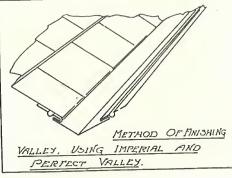














ROOF SECTIONS AND SHINGLE FIXTURES



Roof section showing Queene Anne Metal Shingles



Fig. 405 Two Hips and One Ridge Finial



Fig. 401 Gable Finial



Fig. 805* Continuous Ridge and Hip Shingles with Lock



Fig. 804† Continuous Ridge and Hip Shingles with Nailing Flange



Fig. 806† Ornamental Continuous Ridge and Hip Finish with Nailing Flange



Fig. 807* Ornamental Continuous Ridge and Hip Finish with Lock



Fig. 402 Four-Way Hip Finial

Fig. 404 Ridge and One Hip Finial



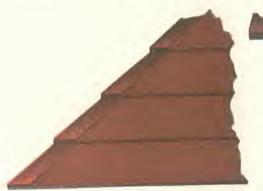
†Fig. 403 H:p Starter Fits Figs. 804 and 806



†Also used with wood, slate or asphalt shingles.



Roof Sections and Fixtures Showing the Old English Shingles



Roof section showing Old English Shingles and Fixtures





Hip Finish (Three Pieces)



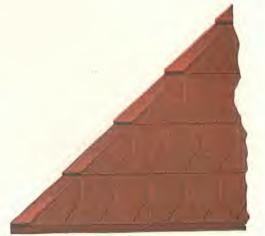
Fig. 231 Hip Finish



Fig. 232 Ridge Finish



Fig. 234 Hip Finial



Roof section showing French Metal Slate with Fixtures



Fig. 233 Gable End Finial



GENERAL FIXTURES

Used with Edwards Metal Shingles



Fig. 412
PERFECT RIDGE ROLL
With Lock and Gutter



Fig. 396 ORNAMENTAL GABLE Starter and Finish



Fig. 1557 GABLE FINIAL



Fig. 427 SIDEWALL FLASHING



Fig. 360 HIP SHINGLES 4 x 9 inch and 5 x 12 inch



Fig. 1400-A GABLE FINIAL



Fig. 428 PLAIN GABLE STARTER AND FINISH



Fig. 361 IMPERIAL VALLEY

EDWARDS METAL SHINGLES possess many advantages over other and more expensive forms of roofing.

They are fire and lightning proof, hail proof, sun proof and leaf proof; they will not crack, break, curl up, rattle or show many other weaknesses such as are common to composition roofs, wood shingles, clay tile and slate.

If given proper care, they will last for generations.

When other forms of roofing have lived their natural lives, they must be replaced, because the substance of which they are made will not permit of their being protected with paint.

An occasional coat of paint applied to an EDWARDS METAL SHINGLE roof will not only improve the appearance of your property but will also enhance its value. Beautiful color schemes may be carried out, providing perfect harmony between the roof and the building it covers.





EDWARDS METAL SPANISH TILE



Fig. 367 FIELD TILE

In Edwards Metal Spanish Tile none of the beauty of this artistic roofing is lost and you can cover your home at a cost of less than one-half that of clay tile, further realizing quite a saving in the construction of the building itself, for our Metal Tile averages about one-tenth the weight of clay tile, requiring only ordinary roof framing.

> For complete information on METAL SPANISH TILE Ask for Edwards Catalog 72

BUNGALOW TILE FIXTURES



Fig. 795 HIP STARTER



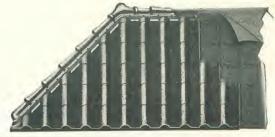
 $\begin{array}{c} Fig. \, 790 \\ \text{RIDGE AND HIP FINISH} \\ \text{USED WITH FLASHINGS} \\ 409, \, 424 \, \text{ and } \, 425 \end{array}$



Fig. 792
HIP AND RIDGE
FINIAL
for 2 Hips and
1 Ridge



Fig. 424
Right Hip Flashing
Used with Ridge and
Hip Finish Fig. 790



Roof Section Showing Spanish Tile with Bungalow Fixtures



EDWARDS STEEL SIDINGS



are replacing other materials

Just as many owners and builders save time and get a better roof by applying EDWARDS Sheet and Unit Roofing directly over the old wood roofing, there is now an increasing tendency to sheathe the side walls with Edwards Sheet Steel. Frame buildings, including residences, garages, warehouses, sheds, barns in many communities have been allowed to deteriorate until rebuilding or major repairs are necessary. Many of these buildings are still structurally sound. However, if they are restored with wood they are left in the same condition as they were before being ill-protected against wind and rain, fire hazards, vermin and vandalism. They will still present the appearance of old structures unless a very expensive wood alteration or improvement is made. Of course, it must be repeated again in a few years.

So thrifty builders are now sheathing structurally sound old buildings with EDWARDS Steel Sidings, pages 53-55.

Steel Sidings and Roofings give strength to weakened framework without materially adding to the weight on the foundation. They reduce insurance rates: fire hazards are less. They give a weather resisting, water-proof shield which protects the framework indefinitely. They make the old siding, plastering, roofing and other materials effect insulation; temperature changes are much less noticeable.

There has been a lot of false economy in neglect of structures in the last few years. EDWARDS Steel Sidings and Roofings enable repairing damages at minimum cost.

It is just as thrifty to apply EDWARDS Steel Ceiling and Siding for the interior remodeling of buildings. See page 56



Furnished in sheets 26 inches wide, 5, 6, 7, 8, 9, 10, 11 and 12 feet long.

Each sheet shows 6 boards 4 inches wide. Can be applied direct to studding as the construction makes it very rigid. Nails are driven through the upper edge of face directly under projecting crimp.

Made from Galvanized Copper-bearing or Open Hearth Steel, also Red Painted Open Hearth Steel.

WEATHERBOARD SIDING



Fig. 33

PRESSED BRICK SIDING



Fig. 35

Both styles of Brick Siding are furnished in sheets 28 inches wide and 5 feet long only.

Each sheet contains 11-2/3 square feet, and a square consists of 8-4/7 sheets.

Each single brick measures $2-4/5 \times 8\frac{1}{2}$ inches.

Allow from 4 to 6 square feet additional to each square for laps.

Made from Galvanized Copper-bearing or Galvanized Open Hearth Steel also Red Painted Open Hearth Steel.

ROCK-FACE BRICK SIDING

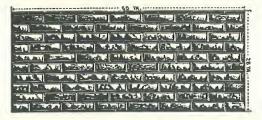


Fig. 36

Sheets are 28 inches wide by 5 feet long. Single stones measure 7 x 12 inches.

A square consists of 100 square feet.

Allow 4 to 6 square feet to each square for laps.

Made from Galvanized Copper-bearing Steel also Painted and Galvanized Open Hearth Steel.

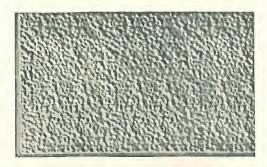
ROCK-FACE STONE SIDING



Fig. 37



SOMETHING NEW STEEL-STUCCO SIDING



An exact reproduction of Pebble Dash Stucco that cannot crack.

Fireproof and Weatherproof

Furnished in sheets 28 inches wide and 5, 6, 7, 8, 9, 10, 11 and 12 feet long.

Fig. 95

Made from Galvanized Copper-bearing Steel, Galvanized Open Hearth Steel and Red Painted Open Hearth Steel

"PRINCESS" CLUSTER SIDING



A splendid representation of cut wood shingles.

Sheets lap one-half shingle at sides.

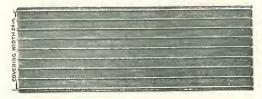
Cannot be used for roofing.

Furnished in sheets 26 inches wide and 5, 6, 7, 8, 9, 10, 11 and 12 feet long.

Fig. 363

Made from Galvanized Copper-bearing Steel, Galvanized Open Hearth Steel, also Red Painted Open Hearth Steel

BEADED CEILING AND SIDING



An extremely neat and attractive ceiling and sidewall finish for storage rooms, milkhouses and many buildings on the farm. Makes an excellent ceiling for porches.

Fig. 32

The beads are small corrugations, $\frac{5}{8}$ inch wide by $\frac{1}{8}$ inch deep and spaced 3 inches apart. Sheets when beaded cover 24 inches and are charged 26 inches wide. Furnished in all standard lengths from 5 to 12 foot. Made from Galvanized Copper-bearing and Galvanized Open Hearth Steel also Red Painted Open Hearth Steel.



CORNER FINISHES



Fig. 351
CORNER FINISH
Each Face 4 inches wide.



Fig. 353
CORNER FINISH
Each Face 8½
inches wide.



Fig. 355
CORNER FINISH
Each Face 7 inches
wide.



Made from Galvanized Copper Bearing Steel, also Galvanized Open Hearth

Plain Corner Finish Fig. 34 is generally used in connection with Metal Weather-board but may also be used with other styles of metal siding and wood weatherboard.

All styles are furnished in 10-foot lengths only.

VALLEY AND GUTTER LINING IN ROLLS



Steel.

Fig. 159

Made from Terne Plate (commonly known as tin), also Galvanized Copper Bearing Steel and Galvanized Open Hearth Steel.

Terne or Tin Valley has single cross-locks soldered and painted red on one side. Galvanized has double cross-locks, not soldered or painted.

Furnished in rolls 50 feet long by 10, 14, 20, or 28 inches wide.



One of the many advantages to be derived from the use of metal roofing lies in the fact that with proper ground connections, the roof is impervious to lightning.

Eaves Trough and Conductor Pipe are used on most buildings and when grounded as illustrated in the sketch below, there need be no fear that any part of the roof will be damaged or destroyed by lightning.

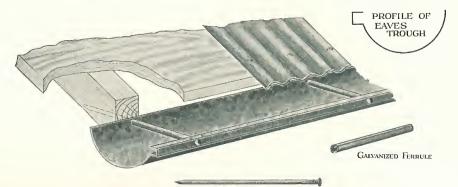
THE MOST APPROVED METHOD OF GROUNDING EDWARDS'
METAL ROOFING AGAINST DAMAGE BY LIGHTNING. EDWARDS' GALVANIZED TIGHTCOYE" COPPER BEARING STEEK ROOFING. MADE BY THE EDWARDS MFG. CO CINCINNATI GALVANIZED EDWARDS' TIGHTCOTE" COPPER-BEARING STEEL WEATHERBOARD GALVANIZED CORNERFINISH DOOR TRIM END SECTION WIRE BAVES TROUGH HANGERS WITH CAP & TUBE CONDUCTOR HOOK CONDUCTOR PIPE COND. HOOK Our Lightning Guarantee Bond is COND. HOOK operative if this plan is followed. It has the addi-COND, HOOK tional advantage COND. SHOE of providing a JURFACE LINE means for properly conserving the wa-HEAVY COPPER WIRE WRAPPED OR SECURELY FASTENED TO SHOE & PIPE. ter supply for stor-I" GALV PIPE, 18" TO 24" LONG BURIED IN PERMANENTLY MOIST EARTH. age purposes.



The Easiest Eaves Trough To Hang

EDWARDS SQUARE BEAD EAVES TROUGH

A radical departure from old-fashioned ideas. Made with both slip and lap joints, in 10 foot lengths only, 4 inches, 5 inches and 6 inches wide.



GALVANIZED CHISEL POINT SPIKE

Slip Joint—Fig. 150 Lap Joint—Fig. 151 Spike—Fig. 151-A Ferrule—Fig. 151-B

Made from Galvanized Copper-bearing Steel, also Galvanized Open Hearth Steel.

THE CHISEL POINT SPIKE and FERRULE are heavily galvanized and furnish a support at least 50 per cent stronger than ordinary wire hangers.

The heavy galvanized coating on the hanger parts makes them practically rust proof. Since the danger of rust is largely eliminated, the gutter does not lose the proper support so necessary to lasting service, and at the same time both the front and back of the gutter always remain in the original position.

The Galvanized FERRULE prevents the gutter from collapsing while the spike is being driven through and also makes it impossible to drive the spike too deeply, therefore, the gutter can not be pulled out of shape while being hung.

Since the spikes are driven into the ends of the rafters, the hanging of the gutter does not, in any way, interfere with the application of roofing material, for the gutter may be hung either before or after the roofing is applied.

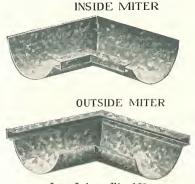
The 4-inch End Section has 2-inch Tube. The 5-inch End Section has 3-inch Tube. The 6-inch End Section has 4-inch Tube.

END CAP

C

Fig. 150

END SECTION WITH CAP & TUBE



Lap Joint—Fig. 152 Slip Joint—Fig. 154



EAVES TROUGH AND FIXTURES

Made from Galvanized Copper-Bearing Steel Also Galvanized Open-Hearth

SLIP JOINT—SINGLE BEAD



Fig. 74*

Ends are fitted with Slip Joints so that connections are easily made without soldering. Always specify in your order whether water is to flow from right to left or from left to right. Unless advised, we will ship half right and half left.

SLIP JOINT—DOUBLE BEAD



Fig. 99*

Beads on both sides make it possible to use on either side of the building, the water running either to the right or left. Gutter should be hung so that water always flows OVER and not against the slip joint.

Both styles of Gutter are furnished 4 inches, 5 inches or 6 inches in width, and are made only in 10 foot lengths.

*We also make eaves trough with the lap joints that must be soldered. The Single Bead Lap Joint is Fig. 98. The Double Bead Lap Joint is Fig. 100.

EAVES TROUGH ENDS AND DROPS

"B"-Tube or Outlet.





Fig. 148

4-inch Trough has 2-inch Tube 5-inch Trough has 3-inch Tube 6-inch Trough has 4-inch Tube

EAVES TROUGH MITRES



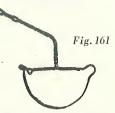
Fig. 147

Made for both single bead and double bead trough. If used with single bead trough, always specify which way water flows.

TRIPLE-TWIST WIRE HANGERS

"A"—Complete End Section with Tube and Cap

"C"-End Cap; used right or left end.



Made for 4, 5 and 6-inch Single Bead or Double Bead Trough.

Page Forty-eight

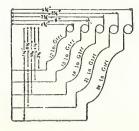


O-GEE OR BOX GUTTER

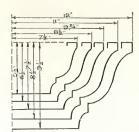
Made in 10 foot lengths only

From Galvanized Open Hearth Steel and Copper Bearing Steel

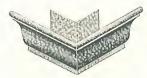
Fig. 149



13/2/201			
	No. of the second	totale control of	A Part Set.
A Comment	the shall me at the after a treatment		Addition of
21位有200000000000000000000000000000000000	A CAROLINA CAR	STEEL STATE OF STREET	PROPERTY CONTRACTOR
	STYLE	1 "G"	
Top Width	Bottom	Depth	Girt
41/2"	25/8"	31/2"	12"
6"	31/2"	43/8"	15"
63/4"	41/8"	51/2"	18"
81/2"	5½"	61/2"	21''
95/8"	6"	71/2"	24"



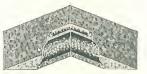
100 - 11 - 11 - 11 - 11 - 11 - 11 - 11	Control of the second		
	STYLI	g "J"	
Top Width	Bottom	Depth	Girt
71/2"	4"	5 3/8 "	18"
81/2"	41/8"	61/2"	21"
93/4"	55/8"	73/4"	24''
11"	61/."	91/."	97"



For Outside Corners

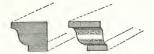
MITRES

Mitres shown are for Style G Gutter, but we make them for Style J Gutter, and also make special angle mitres.



For Inside Corners

GUTTER ENDS



Plain End. Mitre End. Made for both Styles.

GUTTER HANGERS



 $Fig.\,207$ For Gutters with Round Beads.



CONDUCTOR PIPE (Down Spout)

Made from Galvanized Copper-bearing Steel, also Galvanized Open Hearth Steel, in 10 foot lengths only. (We do not cut lengths.)

PLAIN ROUND PIPE-Fig. 73



ROUND CORRUGATED PIPE-Fig. 67



Both styles of pipe are made in 2-inch, 3-inch and 4-inch diameters.

CONDUCTOR PIPE ELBOWS AND SHOES

Made from Copper-bearing Steel, also Open Hearth Steel. Galvanized after forming.

PLAIN ROUND Fig. 145



Elbow



Shoe



Elbow



Shoe

The Elbows Illustrated Above are No. 3-75 degree

When ordering Elbows, be sure to state what angle is wanted; otherwise No. 3-75 degree, will be sent.

will be sent.						
Two inch-	_					
No. 0-30	degree,	two	Crimp			
No. 1-45	degree,	three	Crimp			
No. 2-60	degree,	four	Crimp			
No. 3—75	degree,	five	Crimp			
No. 4—90	degree,	six	Crimp			
No. 3- SI	hoes		_			
Three inch-						
No. 0-30	degree,	three	Crimp			
No. 1-45	degree,	four	Crimp			
No. 2-60	degree.	five	Crimp			
No. 3-75						
No. 4-90	degree,	seven	Crimp			
No. 3— S						
Four inch-						

	No. 3— Sl	hoes		
Four	inch-			
	No. 0-30	degree,	three	Crimp
	No. 1-45	degree,	four	Crimp
	No. 2-60	degree,	six	Crimp
	No. 3-75	degree.	seven	Crimn

No. 3—75 degree, seven Crimp No. 4—90 degree, eight Crimp No. 3— Shoes

Two	inch—			
	No. 0-30	degree,	three	Crimp
	No. 1-45	degree,	four	Crimp
	No. 2-60			

ROUND CORRUGATED

No. 3-75 degree, six Crimp No. 4-90 degree, seven Crimp No. 3- Shoes

Three inch-

		degree,		
No.	1-45	degree,	four	Crimp
No.	260	degree,	five	Crimp
No.	375	degree,	six	Crimp
No.	490	degree,	seven	Crimp

No. 3— Shoes Four inch—

No.	0 - 30	degree,	three	Crimp
No.	1-45	degree,	four	Crimp
		degree,		
		degree,		

No. 4—90 degree, eight Crimp No. 3— Shoes



CONDUCTOR PIPE ACCESSORIES

HOOKS



Fig. 70

Made from malleable iron, tinned.

Sizes 2, 3, 4 inch.

Always specify whether for wood or brick wall.

STRAINERS



Fig. 69

Made from Galvanized Wire.

Sizes 2, 3, 4 inch.

FUNNELS



Fig. 290

For running two pipes into one. Made for standard size pipe.

EDWARDS RAIN WATER CUT-OFF



Fig. 153

DURABLE,
CHEAP
AND SIMPLE
Sizes 2, 3, and 4 inch.

EDWARDS BARN DOOR TRACK COVER



Fig. 696

Made in two sizes, 12- and 14-inch. We manufacture this track cover of the best quality galvanized steel, in 10-foot lengths.



VENTILATORS

Stationary, Revolving, Ornamental and Plain With and Without Dampers

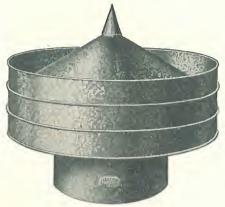


Fig. 1587

BASES FOR VENTILATORS

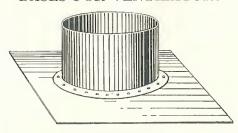


Fig. 1587B

For Slope of Roof

Flanged Base. In ordering this style it is necessary to give pitch of roof.

These bases will fit any style or size of Edwards Ventilator.

We will be glad to help you with your ventilating problems. Put them up to us. Furnished in various sizes ranging from 10 inch to 6 foot in diameter, with or without damper.

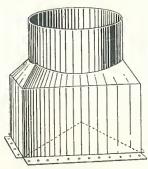


Fig. 1587A

Square Base for ventilator. Can be made to fit any pitch of roof. State whether for comb or side of roof, also give pitch of roof. If this information is not given, we ship as per illustration and customer can cut out (as per dotted lines) to fit roof at building.

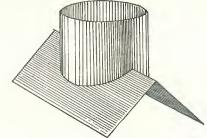


Fig. 1587C For Ridge of Roof

Flanged Base for ventilator. In ordering this style base it is absolutely necessary to give pitch of roof.



ORNAMENTAL VENTILATORS

Fig. 1598 THE MOST ORNAMENTAL VENTILATOR MADE

Edwards Ventilator No. 1598 is the most artistic and ornamental Ventilator made, where efficiency is not sacrificed. This ventilator is absolutely guaranteed against down draft. Suitable for any type of building and made in any size required. Can furnish 18, 24, 30, 36, 40, 48, 60, and 72 inch diameter.

Fig. 1599

Same as above, but without weather vane and compass points.

EDWARDS REVOLVING VENTILATORS

These ventilators are designed to meet the demand for a good revolving ventilator at a moderate cost, Bearings are noiseless and friction is practically eliminated.



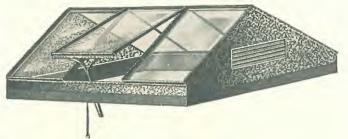
Fig. 1589

Revolving Ventilator

(Front and Right Side View)



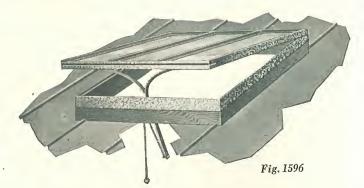
EDWARDS SKYLIGHTS AND SKYLIGHT VENTILATION



These pictures merely suggest what we can offer you in the line of metal skylights.

Fig. 1595 Edwards Skylight Showing Ventilator Open

We make them with or without ventilating devices, single pitch, double pitch, hipped with or without louvres and in any size desired.



Details of the Ventilator Device

3-V PERFECTION SKYLIGHT

CORRUGATED SKYLIGHT



Fig. 188

We can furnish any of our roofing sheets with Skylights built into them, the roofing sheet and Skylight being one unit.

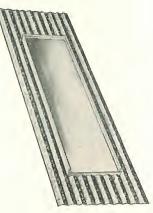
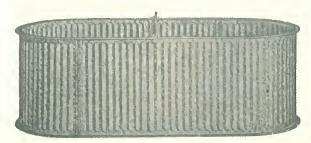


Fig. 189



GALVANIZED STOCK WATERING AND STORAGE TANKS

Vertical Corrugated Type - Made in any size desired

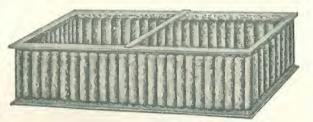


ROUND END STOCK WATERING TROUGH

Fig. 908

SQUARE END STOCK WATERING TANK

Fig. 909





WAGON TANK

Fig. 912

CYLINDRICAL STORAGE TANK

Fig. 911

All of our tanks are tightly riveted at the bottom and side seams with waterproof packed joints, and are galvanized reinforced at the top.

All tanks can be furnished plain (not corrugated) if so ordered.



Page Fifty-five



EDWARDS STEEL CEILINGS Make the Home Livable, Lovable, Salable



Flush Back Panel No. 2329 24" x 48"

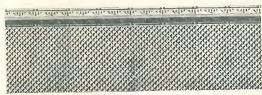


Plate No. 2030 24" x 48"



Plate No. 2056 24" x 48"

Cornice No. 1663
Depth 3", Projection 3", Length 48"



Modernistic Filler No. 2057 Width 6" to 24", Length 48"

There is something alluring about the smell of fresh paint and varnish but it takes more than exterior appearance to make us love a home. The real reason must lie in something under the roof. A home becomes lovable as it becomes livable. Nowadays we want to use the entire house . . . we want it to be easily cleaned, easily decorated, attractive, safe. wonder steel ceilings have long been used to replace cracked or dangerous plaster ceilings in kitchens, dining rooms, in fact in every part of the house. Even basements have taken on new dignity, as shown in the picture below. At left is a "homey" dining room made more attractive with an EDWARDS fire resistant Steel Ceiling.

The pictures above only sample the entire line of Edwards Steel Ceilings. Send for Catalog 180. Let us make an appropriate layout for any room in your home where the plaster ceilings are cracked or broken. Send us measurements so we can tell you what it will cost for an attractive Steel Ceiling, easily erected without removing plaster. And you'll be rid of those ugly gaping cracks and wrinkled seams that show up soon after you repaper.







ROOFING TOOLS

In the application of Standing Seam Roofings in sheets or in rolls, special tools are required to form or to close the side seams. We are glad to furnish such tools as are needed, asking you only to deposit their cost when ordering, and when they are returned to us the deposit is refunded, less transportation charges. This offer applies on condition that they are returned in good order, allowance being made for ordinary wear and tear, and that your roofing is purchased from us.

JOINTER OR END-LOCK FORMER 22 inches long



Used to form end-lock on sheet roofing

IMPROVED DOUBLE SEAMER
Three tools in one



Furnished in 1 and 1½ inch. For folding and closing seams of Roll Roofing.

MALLEABLE TURNING OR EDGING TONGS



Furnished for turning 1, $1\frac{1}{2}$ or $1\frac{3}{4}$ inch edges on roll roofing.

PLAIN SOUEEZING TONGS



For closing seams 1 inch high.

FOR APPLYING PRESSED STANDING SEAM ROOFING IN SHEETS — One 1-inch Squeezing Tong, One End-lock Former, One Pair Tinner's Snips.

FOR APPLYING SELF-CAPPING DOUBLE-SEAM ROLL ROOFING — One $1\frac{1}{2}$ -inch Edging Tong, One $1\frac{3}{4}$ -inch Edging Tong, One 1-inch Double Seamer, One $1\frac{1}{2}$ -inch Double Seamer, One Pair Tinner's Snips.



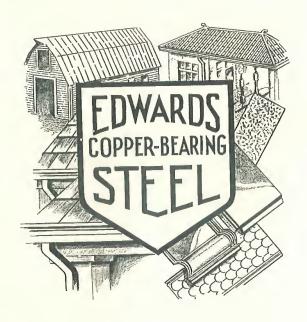
BUY FROM A RELIABLE MANUFACTURER

People buy from the house that gives them the best and the most for their money. They always have, and they always will.

Now when one concern forges ahead of all the rest, does a bigger business than all the rest, it means that there exists a surpassing preference for their goods. And where there is surpassing preference for a certain make of product, there must be surpassing quality—surpassing satisfaction—in dealing with the house that sells the product.

When you buy your metal roofing from us you are dealing with a reliable manufacturer, and we are directly responsible to you. We guarantee you absolute satisfaction, within reasonable limits, and you know that such a statement made by a firm of our standing and size means something. We have a reputation to uphold and a valuable good will to protect. Therefore, it is to our advantage to see that every transaction is perfectly satisfactory to the purchaser.

Our reputation has been built upon a solid foundation—SATISFACTION AND SERVICE—and when a sale has been consummated it continues to remain a source of pride and satisfaction to us for a period of years because we know that the customer has become a satisfied one.





Make Use Of Our Experts

ENGINEERING We maintain an engineering department trained especially to help our customers in figuring their requirements of anything shown in this catalog. We invite you to let us do your estimating. All that we require is a rough sketch with the necessary measurements on it and your suggestion of the style and grade of material you have selected.

This will enable us to acquaint you with the exact cost of everything you need. On the other hand, if you do your own estimating and are in doubt as to the correctness of your figures, let our engineering department check them for you. Don't hesitate to call on us for any help that you need as we stand ready and willing to render every service possible — without, of course, obligating you in the least.

The figuring of freight rates and the proper routing of TRAFFIC shipments can only be properly handled by experts who have been trained along these lines and who have a thorough knowledge of railroading. In our Traffic Department are men of long experience who know how to route shipments by freight to obtain the lowest freight charges, and secure the best and shortest deliveries. When you are planning the rebuilding, remodeling, repairing, or new construction of buildings, by all means get in touch with our Service Department so that they can help you with your problems.



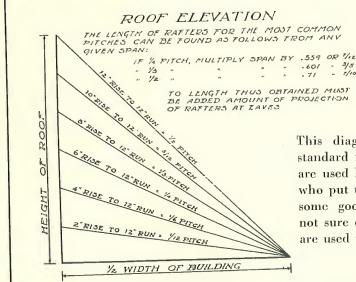
ROOF PITCHES: WHY AND HOW

Drainage Naturally, the pitched roof insures proper drainage and the quicker removal of snowfall in winter, materially reducing the danger of leaks.

Insulation The pitched roof provides a blanket above upper rooms or upper floors, a considerable factor in reducing heat loss

Rise means the vertical elevation of the rafter at a given point. The term "rise" is always used in connection with the term "run." A roof rises a certain number of inches to each foot of the run.

Run is the horizontal measurement from the plate to the center line of the building, in linear measure.



This diagram shows the standard roof pitches that are used by all carpenters who put up buildings, but some good workmen are not sure of the terms that are used to describe them.

through the roof in the winter, effecting fuel economy. It makes the building cooler in summer.

Beauty The eye quite naturally is relieved by the sweeping angles, gables, slopes of a pitched roof; rebels against the straight lines and cubical effects of the flat roof.

Pitch means the angle or slant of the rafters in a straight line from the plate to the peak of the roof. Rise is the vertical climb of the rafter expressed in feet or inches.

For example: The rise of a half pitch roof is equal to the run, which means that the distance from the plate to the center line of the building is the same as the distance from the center line to the peak. The rise of a one-quarter pitch roof is just half as much.



COMMON SENSE FOR ROOFERS

Always wear rubbers or rubber sole shoes if you must walk on the roofing when applying it.

Never hammer directly on the roofing with a steel hammer. Use a block of wood or wood mallet.

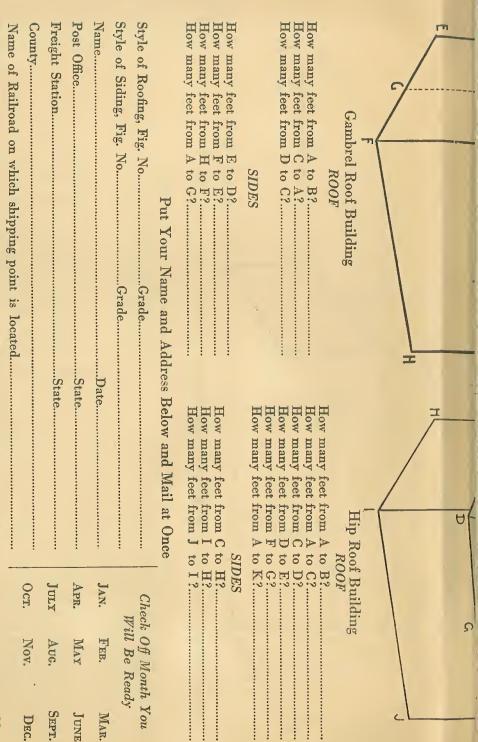
Painted roofing and shingles must be given another coat of paint immediately after being applied.

Never use paint that contains coal tar as it is injurious to steel.

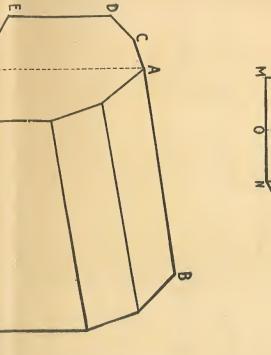
Galvanized nails cost very little more than common nails so it is more economical to use them as they do not rust.

Any roofing that is applied by driving nails through the wearing surface and left exposed to the weather will not last as long as one that has provision for covering the nails.

On cattle barns if sheathing paper is used under the roofing, the vapors from the animals and manure can not condense on the underside of the roofing and cause "sweating."



NOTICE! If this sheet is filled in and mailed at once to The Edwards Manufacturing Co., Cincinnati, Ohio you will know in a few days the cost of roofing or siding your building.



How

many

How many How many

feet from

P to

to T

How many

feet from R to T? feet from Q

from B to S?

How

many

feet from N

to P?

many

feet from L to M?......

feet from C to K?......feet from K to L?....

feet from C to D?.....

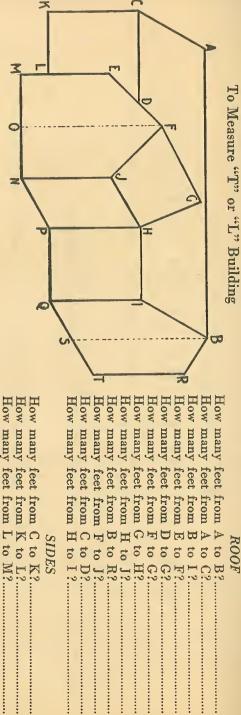
feet from F to J?.....

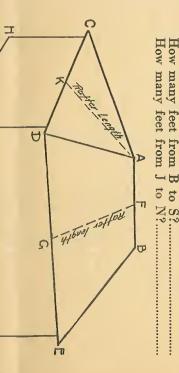
B to R?.....

***************** ****************

..................

feet from feet from





			ス	9			
How	How	How	How	How	How	How	
many	many feet	many feet	many	many	many	many feet	
feet	feet	feet	feet	feet	feet		
from	from	from	from	from	from	from	
(T	埘	D	H	В	A	A	5
ţ	to	to	to	to	to	to	ROOF
many feet from G to H?	G?	G?		I ?	C?	В?	OF
	:			:	:	:	

Alwa apply

Neve. wood

Paint after

Neve

Galva cal to Any

left e

cover

On c. the a cause,

THE EDWARDS MANUFACTURING CO.

CINCINNATI, OHIO

SHCIREPFLN

John L. Frenchs

Catalog
89